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CONSERVATION OF WATER RESOURCES IN NEW YORK STATE

By David R. Cooper

Engineer-Secretary to the New York State Water Supply Commission

THE people of the State of New York have a deep natural interest in the important economic problems recently brought so forcibly to the attention of the American people through the agency of what has appropriately been termed "the conservation movement." That interest is properly manifested because, in all probability, no State in the Union is invested with conditions so favorable and opportunities so promising for the early accomplishment of material progress in the practical conservation of one of the most valuable natural resources.

WATER AS A NATURAL RESOURCE IN NEW YORK STATE

In New York State the surface water supply as a natural resource is second in value only to the land itself, which indeed owes its value largely to the existence of such an abundant natural water supply.

The value of water varies considerably, according to the use to which it is applied. It must be conceded that its value for potable and domestic purposes cannot be estimated in dollars and cents, constituting as it does a necessity of life for which no substitute exists. Its money value in such cases is represented by whatever it costs to obtain the supply, be that much or little. But aside from any such consideration as this, water is practically the only natural resource

within the State of New York for the development of power, that great and fundamental requisite to the prosperity and comfort of a civilized community. The State does not have a coal supply of its own, not even enough to operate its existing iron mines, to say nothing of mining the whole of the valuable deposit, estimated at three hundred million tons.

This condition is compensated for in a large measure if not altogether, by the fact that, in addition to the existence of an abundant water supply, the profiles of the streams and the general topography of a large portion of the State are naturally favorable for the establishment of hydraulic power developments, and the construction of storage reservoirs for the regulation of the flow of the streams. These reservoirs are an essential feature of the plan for conserving the waters of New York State streams.

The State has taken a notable forward step in the conservation field, by assuming certain regulative powers over the disposition of these resources and by the institution of a systematic inventory of them to determine the extent, not only of the supply, but of existing developments and present uses, and the possibilities for additional uses and new developments. It has also made extensive studies to determine the possibilities for water storage reservoirs.

DEVELOPMENT OF WATER CONSERVATION AS A STATE POLICY

In 1902, a special act of the Legislature created the Water Storage Commission which was directed to make surveys and investigations to determine the causes of the overflow of the various river and water courses of the State, and to determine what, if anything, could be done to prevent such overflow. That Commission after about a year's investigation and research, with a remarkably small appropriation at their disposal, submitted to the Legislature an extremely valuable and comprehensive report on the flood conditions of the principal streams of the State. The report pointed out that storage reservoirs constituted the only practicable solution of the problem in the majority of instances, and recommended the construction of several such reservoirs at points where conditions were known to be favorable. Having submitted its report to the Legislature, the Water Storage Commission automatically ceased to exist.

The next step in the development of the water storage movement was the creation of the River Improvement Commission by act of the Legislature in 1904. That Commission was clothed with power to make preliminary investigations, plans and surveys for the regulation of any stream, the restricted, unrestricted or irregular flow of which should be shown by petition of local residents to be a menace to the public health and safety of the community.

While the River Improvement Commission was still in existence, the State Water Supply Commission was created in 1905; the primary object of its creation being to insure an equitable apportionment of the sources for public water supplies among the various municipalities and civil divisions of the State.

By act of the Legislature of 1906, the River Improvement Commission was discontinued as a separate board and all its powers and duties were transferred to the State Water Supply Commission. This action was in accor-

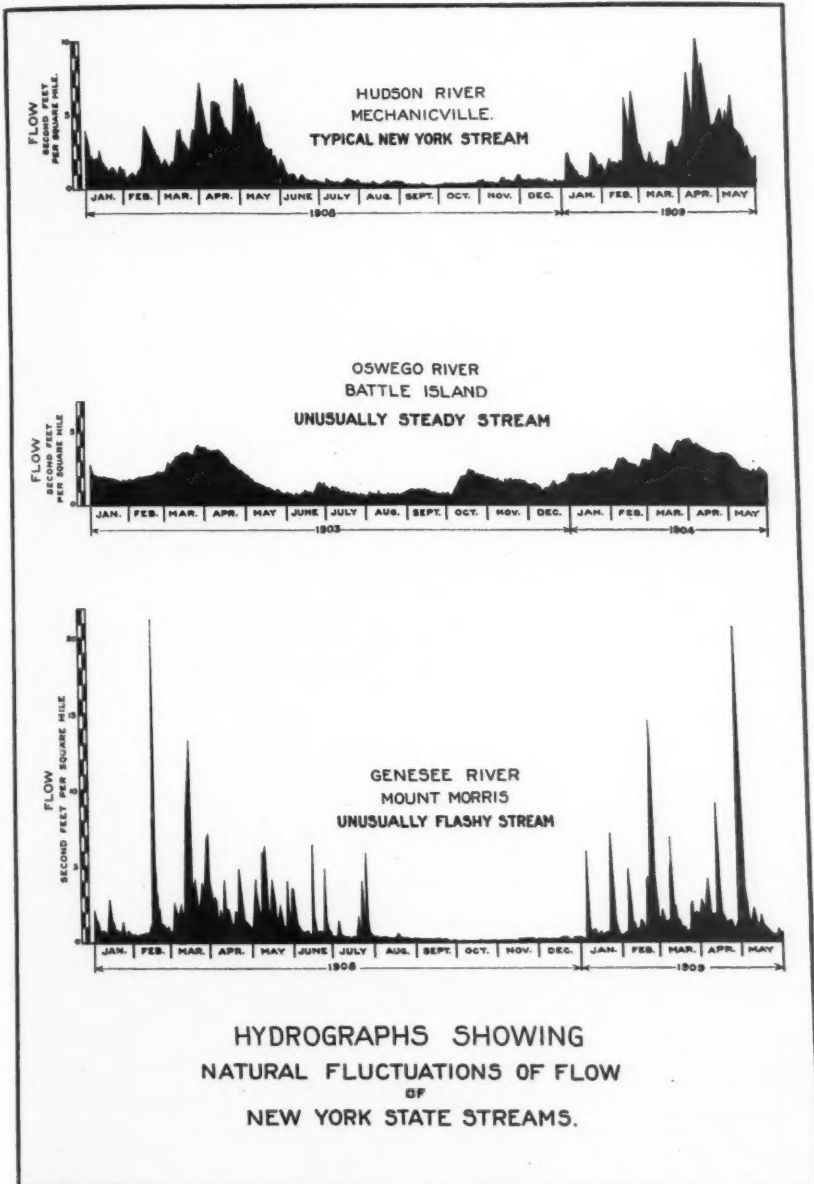
dance with recommendations made to the Legislature by the members of the River Improvement Commission. The jurisdiction of the Water Supply Commission was subsequently extended to an investigation of water powers within the State, and the preparation of a plan for their general development.

The Commission is, therefore, engaged at the present time in three distinct but closely related lines of work: (1) the apportionment of public water supplies; (2) the improvement of rivers in the interest of public health and safety, and (3) the formulation of a plan for the general development of the water resources of the State. Only the last of these can be intelligently discussed in the space here afforded.

WATER POWER AND WATER STORAGE POSSIBILITIES

The most recent extension of the jurisdiction of the Water Supply Commission, and under which it is investigating the water resources of the State, contemplates three principal lines of operation. These are: (1) to collect information relating to the water powers of the State; (2) to make plans for such specific developments as the Commission deems available, and to make such other investigations and studies as will enable it (3) to devise a comprehensive and practicable plan for the general development of the water powers of the State for the public use and benefit and the increase of the public revenue, under State ownership and control.

In accordance with this statute, the Commission has proceeded to investigate in great detail the conditions governing rainfall and runoff of streams within the State. A detailed investigation was also made by competent engineering employees to determine the number, capacity, equipment and other material information, relating to practically every developed water power in the State. A general investigation of topographic conditions has also been made and practically all



promising storage opportunities have been located and their approximate possibilities determined. A number of great reservoir projects have been surveyed and mapped in great detail.

The first important fact that impresses itself upon the investigator is that in spite of the great natural advantages which New York State possesses in its interior streams with their enormous possibilities for power, developed and undeveloped, the fullest utilization of these possibilities can never be realized under existing conditions. Every river in the State exhibits such irregularity of flow in its natural state that the water power which may be economically developed from the present minimum flow is far below the average which can be attained by means of scientific regulation. The difference between maximum and minimum flow of most of our streams when stated in figures is startling to the layman. The Hudson river, which is more or less typical of the streams of the State, has a maximum recorded daily discharge one hundred times as great as its least daily flow. The Genesee river, which is much more flashy, has a maximum daily discharge about four hundred times the minimum daily flow. On the other hand, the Oswego river, which is naturally more or less regulated by the storage in the "Finger Lakes," has a maximum discharge about twenty times as great as the minimum. The yearly discharge of some of the rivers in a wet year is nearly double the yearly flow of a dry year. On a great many streams as much as three-fourths of the volume of yearly flow usually runs off during a period of a few months in the spring and early summer.

These remarkable natural fluctuations of stream flow are principally attributed to the uneven distribution of precipitation through the year and the varying evaporation, which is generally greatest in the months of least precipitation. Over a large portion of the State, the greater part of the annual precipitation occurs in the winter and spring months. Consider-

able water is temporarily stored in the snow banks and is usually reduced to the equivalent of rain simultaneously with the customary heavy rainfall of the early spring months. It is quite a common occurrence for millions of cubic feet of water to be running over the falls and dams in the streams during these spring freshet periods, which if it could be stored until the drier summer and fall months, would be of wonderful utility in not only maintaining a higher rate of flow in those dry months, but also doing away largely with the damage and inconvenience incident to the sudden runoff of flood waters in their natural condition. These conditions point almost universally to the necessity for large water storage reservoirs as the only practicable means of accomplishing any considerable degree of regulation.

The investigations of the Water Supply Commission have shown that there is an installation of water wheels having a capacity of about 830,000 horsepower within the State of New York, of which amount about 200,000 horsepower is at Niagara Falls. The average daily output of these plants is about 620,000 horsepower of which 145,000 horsepower is produced at Niagara Falls. There are in all more than 1800 hydraulic power plants within the State, many of which are equipped with steam auxiliary power plants of considerable capacity. The total capacity of these auxiliary plants is about 124,000 horsepower. In most instances the use of this large auxiliary power equipment is not sufficient to enable the plants to be operated on full time during the dry months of the year.

The investigations to determine power possibilities have indicated a total development of about 1,500,000 horsepower to be economically feasible within the State. This amount of power would be uninterrupted continuous power and exclusive of the Niagara river, where the development of power is limited by federal statute, and the portion of the St. Lawrence river not under the jurisdiction of the State of New York. A considerable

part of this amount is represented by that which would be added to the existing developments by the regulation of the flow of the streams.

A number of individual opportunities exist for large new developments, some of the most important of which are: 30,000 horsepower on the Genesee river at Portage Falls, 30,000 horsepower on the Sacandaga river at Conklingville, 32,000 horsepower on the Raquette river at Colton Falls. There are many other possibilities for developments ranging from 1,000 to 20,000 horsepower.

Among the most promising opportunities for the inauguration of a State policy in storage reservoir construction is that offered by the conditions on the Genesee river. The Commission's investigations have shown that it is practicable to build a dam near Portage, N. Y., which would create a reservoir about fifteen miles long and over a mile wide, with a total capacity of about eighteen billion cubic feet. The cost would be about \$4,500,000. The regulation of the stream by this reservoir would not only practically do away with disastrous floods in the Genesee valley, but would add power worth at the very least \$200,000 a year to the existing power developments on the lower reaches of the river at Rochester. A new power development amounting to at least 30,000 horsepower would be possible in connection with the dam. The value of water power at Mount Morris would also be greatly enhanced and the nuisance created by the present polluted condition of the river below Rochester would be done away with.

On the Sacandaga river a reservoir about twenty miles long and over forty square miles in area is proposed. This basin has a capacity of about thirty billion cubic feet. There is the possibility of a 30,000 horsepower development in connection with the dam. At the same time the release of stored water would result in raising the present minimum power of the Hudson river in the principal power district by about 80,000 horsepower.

The other tributaries to the Hudson are proposed to be regulated by one reservoir of about sixteen billion cubic feet on the Schroon river and one of twelve billion cubic feet on the Indian and Cedar rivers.

On the Raquette river are possibilities for storage sufficient to equalize the flow completely. This requires about twenty-one billion cubic feet of reservoir capacity. On the Black river a system of several reservoirs is proposed, totaling about thirteen billion cubic feet capacity. Many other smaller projects are under consideration but present conditions of power demand are not so favorable as in the above mentioned instances. It is estimated that \$20,000,000 would be sufficient to build all the reservoirs whose construction is justified under present conditions.

NEED FOR COMPREHENSIVE PLAN AND DEFINITE POLICY

In view of the promising possibilities and the large values involved, the importance of a fixed policy establishing State leadership and control in the matter of water conservation cannot be over estimated. Without it, there is no place for consecutive and correlated action, either executive or legislative. In the past the State has had no policy of power development, either under public ownership or by encouragement and regulation of private or corporate development. Unlike many other states, New York has never, under general laws, granted the right of eminent domain to individuals or corporations for the purpose of flooding lands to create storage reservoirs and developing water power. Moreover, it must be conceded that in view of the doubtful constitutionality of the "mill acts" of other states, and particularly in view of the strength of the modern sentiment demanding universal sharing in the benefits of natural resources, this State is not likely in the future indiscriminately to grant its power of eminent domain for this purpose. Unless the State shall

define its policy and enter upon the work of carrying it out, this feature of its natural resources must largely remain in its present undeveloped condition, or be subject to the same haphazard and uncontrolled methods of utilization that have governed in the past. If we are to permit private interests to build storage reservoirs for power purposes on any broad and satisfactory plan it can only be done by amending the Constitution. As adequate reservoirs cannot be generally constructed for power purposes by private enterprise without constitutional amendment, and possibly not then, it seems that the better way to accomplish this object is for the State itself to announce its policy and undertake its performance in the interest of the people at large.

Development by the State would insure the fullest possible utilization of the power possibilities of each stream, whereas development by uncontrolled private enterprise often involves waste of resources. Private capital, seeking the greatest possible immediate return on the investment, naturally confines its attention to the most concentrated portion of a given fall. The less precipitous portions of the fall above and below, involving a large unit outlay in development, are consequently apt to be neglected, and in too many cases permanently wasted, because no other enterprise is likely to undertake their development afterward, even if the rights of the

company already on the spot would permit this to be done.

On the other hand, the State, with its greater power and scope, and with financial resources enabling it to defer the return on its investment, could undertake the construction of the more extensive works necessary to develop the full extent of the fall in the supposed case. Without amplifying the point, it should be clear that the State is the only authority with sufficient power to ensure the complete development of each and every stream so that every foot-pound of energy represented by its falling waters may be given up when necessary to the service of man.

On the other hand, the prime inclusive reason for the exercise of State authority over the control of stream flow for power development is that, under modern social and economic conditions, this step is necessary to ensure the equal participation by all citizens in this form of natural wealth, which is peculiarly the heritage of the whole people. It appears that from all points of view the State is the proper authority to undertake and carry out the conservation of its own water resources. Legislative consideration of the subject has been slow, and it still remains to be seen whether the State will take advantage of its wonderful opportunities before private interests get the remaining cream and it is too late for the State to act effectively.



THE CHURCH FOR THE WORKING FARMER

By Warren H. Wilson, Ph.D.

EDITOR'S NOTE.—Dr. Wilson is Superintendent of the Department of Church and Country Life of the Board of Home Missions of the Presbyterian Church. He was one of the speakers at the Rural Church Conference held here during Farmers' Week.

THE church is dealing in the country community with a healthy and moral population of American stock. Our recent investigations in Pennsylvania, Indiana, and Illinois have shown that the farming population has high vitality, is free generally from immoral conditions, and is but little affected by the immigration which is filling the cities and the factory towns. The process described by Anderson in "The Country Town" is shown to be very general in the sifting of the country population. The bolder and more enterprising individuals, both good and evil, have gone to the city. The country church, therefore, has to deal with an unprogressive healthy, satisfied, and American population.

The work of the church is profoundly affected by the redistribution of land which is going on all over the United States. Since 1890, as recently shown by Prof. J. B. Ross, the exploitation of land throughout the country has gone very far, especially in the Middle West. Before that time the farmer had permanent notions of country residence. The evidences of this exploiting in land are shown in tenant farmers, absentee landlords, retired farmers and speculators. Under these conditions entirely new values of land and men have come to prevail in the country community. The earlier values were based on the first use of the soil, the first values of timber and of pasture, the first profits of the market.

Present values are based on final or marginal utility. Their source is not plenty, but bare subsistence. The profit made under the new condition is a profit in the by-products, whereas the earlier profit was a substantial portion of the raw products of the soil, the forest, and the pasture. We are obliged to deal too with marginal values in men. The church in the

early days standardized her work upon the leading citizens, upon the brighter and abler, the wealthier and the more successful members of the congregation. The modern church is directing her policies by the needs of the poor. The country church today has learned that her survival is dependent on the tenant farmer and farm hand, upon the young people of the community and the boys and girls in the farm household. If the church can minister to these effectively, it will survive, for they are the marginal units by whom human values are today determined.

Once again, in America we have a time when the "soil is holy."

The modern prophets of the holiness of the soil are economists. These men value the soil for its utility in meeting the needs of the whole people. The soil is holy in their estimation because only by its conservation can the poor be fed and clothed. The test of American husbandry is its value to landless men, tenant farmers in the country, and workingmen in the city, who do not own the tools by which they get their living. The soil is declared to be holy by the scientific agriculturists, because it has values for our children as well as ourselves. It must not be wasted, or robbed or exploited, because to waste the soil is to rob the poor and to increase the cost of living for the workingman and to lay burdens upon our children, yet unborn.

We have, then, a new kind of holy man and woman in this country. I think it is fair to say that no woman in America is more loved and revered than Jane Adams, who has devoted her life to the service of marginal people in Chicago. The leading member of the Negro race, who possesses the respect and affection of both the White and the Negro, is Booker Washington, who is ministering to the

Negro as a marginal element in the American population. The poor, that is, they who are without land and without ownership in the tools of modern industry, determine the moral and spiritual conditions in the community. Tenants and farm lands set the moral tone with the same precision with which the marginal mill hand fixes the wages in the cotton mill. For this reason institutions such as the country church are obliged to turn their attention to the service of the poor. The country church and the country school will survive or perish by the ministry they can render to the duller and weaker folk in the country. To help them is to help all. This can be said of no other class in the country community. The poor are the distributing centre of all advantage for the community, as a whole. The dull and the ignorant who are just able to survive in the community must be the target of all policies which are to have value for the whole community.

This is the reason why the country school needs to be improved. The one-room country school has had great influence upon the bright and ambitious pupils, who loved books and desired to get on. It has sent them out of the community, being organized "as if to populate the city at the expense of the country." But the country school must be reformed in the interest of the dull but industrious, who will permanently live in the community. The determining principle in reforming the country school is to make it an institution for teaching agriculture and giving general industrial training to those whose lives shall be lived in that community.

We have churches of this sort. Du Page Church in Illinois, under Mr. McNutt's pastorate, has ministered to the needs of the young people in a populous countryside. It has satisfied the social requirements of that community and thus served all the needs of the people there.

West Nottingham Church in Maryland, under the leadership of Mr. Polk, has become a centre of better agriculture. In an old farming country

where the tillage of the soil must be radically improved, Mr. Polk has become conspicuous in the Farmers' Club, which is reorganizing the farming industry on a scientific basis. This church is re-establishing the farming population and making it permanent on a basis of husbandry.

The uniting of a whole community in one church was my own task in this State in my first ministry in Dutchess County. The determining principle in organizing this church at Quaker Hill was that all the Christian people of the community should be served by the new organization. Members and attendants of all the denominations were received into this small church. At its organization it was sanctioned by the five congregations surrounding it, representing five different denominations.

At Rock Creek, Ill., and at McNab, Ill., the leading members of the country church have in each community effected the reconstruction of the country schools. They have secured in the open country a centralized and consolidated school through which the retirement from the farms has been stopped and the building of the country community has been made possible.

"The best farmers in America," says Prof. Carver of Harvard, "are the Mormons, Scotch Presbyterians and Pennsylvania Germans." I am not an authority on Economics, but I can lay alongside of this statement the fact that the best country churches in America are Mormon, Scotch Presbyterian, and Pennsylvania German. These farmers till the land by their religion. They worship God as united farming communities. They think the land is holy, as Dean Bailey has declared. They have not been affected by redistribution of land. Their acres are not for sale, neither are their country churches suffering any distress, because they have long ago discovered and continued to practice the principle that agriculture is a religious occupation and the Christian Church is a perfect expression of the devotion of the rural economy.

CAUSES FOR TUBERCLE BACILLI IN MARKET MILK AND METHODS FOR THE CONTROL OF BOVINE TUBERCULOSIS

By Veranus A. Moore

Director of New York State Veterinary College, Cornell University

Presented before the New York Farmers, Feb. 21, 1911.

IN order to appreciate the significance of bovine tuberculosis fully it must be understood in connection with all of its relations and conditions. In recent days our people have awakened to its destructiveness, the suffering it occasions and the hardships it has brought to humanity. It would seem from the great activity of the present concerning it that tuberculosis was a new disease of cattle. This is not the case, but quite the contrary it is one of the oldest affections of the bovine species of which we have identified records. Long centuries before the Christian era there were ecclesiastical enactments against the consumption of the flesh of tuberculous cattle. All down the centuries the enactments of the people of one generation concerning it have been modified or rescinded by those of the succeeding ones.

The real problem with tuberculosis began to unfold itself with the discovery of the tubercle bacillus in 1882. This proved that tuberculosis was a specific infectious disease. It was believed by Koch and those following his methods that the bacilli of tuberculosis of man and other mammals were identical. The next important discovery was tuberculin. Koch found in 1890 that the fluid on which tubercle bacilli had grown possessed certain properties among which was that of causing a rise of temperature in animals suffering from active tuberculosis. In testing this, it was found that large numbers of apparently healthy cattle were infected. This gave rise to the great movement in this country of testing dairy cattle with tuberculin and killing the reactors. To do this the States were called upon to make large appropriations to partially compensate the owners for the animals destroyed.

The sanitarians and others who advocated this procedure were working on three hypotheses: (1) that the human species was being extensively infected with the bovine germ; (2) that tuberculin was an infallible diagnostic agent, and (3) that all infected cattle were spreading the bacilli.

In 1898, Dr. Theobald Smith reported his very significant findings that there were three distinguishable differences between the human and bovine tubercle bacilli. These were differences in the appearance of their growth on blood serum, their morphology and their virulence. He pointed out that the bovine germ was virulent not only for guinea pigs but also for rabbits, cattle and other species, while the human species possessed little, if any, disease producing power for these animals other than the guinea pig. This was followed in 1901 by Koch's famous paper at the International Congress on Tuberculosis in London at which he gave the impression that human and bovine tubercle bacilli were entirely different. This caused considerable consternation in the ranks of the sanitarians. It stimulated a large number of investigations, many of which have been continued until the present time. The German and English governments appointed commissions to investigate the subject. The result is that two very well defined varieties of mammalian tubercle bacilli have been determined, one in man, the other in cattle. The further fact has been made very clear that young children are frequently infected with the bovine type of the germ.

The many examinations for tubercle bacilli in the market milk of our large cities have shown that from five to sixteen per cent. of the samples contain tubercle bacilli. This is a fearful in-

dictment against our milk supply. It discloses a menace to public health resulting, according to statistics, in the death of from 100 to 200 children annually in this city alone. Economically it threatens the milk industry by creating a legitimate fear of this most natural of all foods.

The questions I was assigned to answer are, Why are there so many tubercle bacilli in the market milk of our large cities, and what methods are there for the control of tuberculosis in cattle?

The explanation for the bacilli in the milk is found in two facts. First, the ordinary inspection of dairies by Boards of Health is made largely by laymen, who are not qualified to judge of the physical condition of the cows which are producing the milk. The second is that the severity of the American method of testing with tuberculin and killing the reacting animals has discouraged dairymen from making the test privately, and the State appropriations have been too small to have them made officially. The result is that an efficient, systematic method to prevent the entrance and to check the spread of tuberculosis in cattle is being followed in a very small percentage of our dairies. Again, other factors have contributed to the present conditions. Among these is the former habit of selling at auction badly infected herds, often pure breds, where owners of sound animals bought one or two individuals to improve their stock, but in so doing they unfortunately, and perhaps innocently, bought centers of infection. Another cause is to be found in the constantly increasing demand of the growing cities for more milk, and the demand is continuous throughout the year. This has revolutionized the former methods of handling milch cows. To supply the demand dairymen must keep their herds milking throughout the year, hence they buy fresh cows and sell the dry ones. By reason of this a mighty stream of living cattle is constantly flowing through our dairy districts. Many of these animals are infected but they continue

in the stream until they become well advanced cases and spreaders of the virus before they are sold as "band boxes" to certain dealers who dispose of them for certain forms of cheap meat. It is the presence in the dairies of advanced cases of pulmonary or intestinal tuberculosis and cows with tuberculous udders that causes the large number of tubercle bacilli to be found in our market milk.

The control of bovine tuberculosis has been a subject of much thought. Many of the channels nature provided for the dissemination of tubercle bacteria have not been closed with the promptness that might be expected. The control of a disease like tuberculosis in which the infected animals still retain their productiveness for a very long time, presents difficulties of both sanitary and financial significance that are hard to adjust.

The American system of tuberculin testing dairy cattle and slaughtering the reactors has been, and still is being carried out as extensively as the State appropriations permit. It was found, however, that there were too many animals infected to apply the method generally, as sufficient funds were not forthcoming. As a result the official use of tuberculin is greatly restricted. In 1910, only about one per cent. of the cattle of this State were officially tested. The milk consumers and often the health authorities in this country have demanded the tuberculin testing of cattle and the slaughter of the reactors—no matter how slightly they were affected—or they have been content to do nothing. Our people have not been willing to abide by conservative, progressive methods that would steadily increase the purity of the milk and eventually eliminate the disease. Bovine tuberculosis has, under the changed conditions in milk production, had an opportunity to spread rapidly owing to the great increase in cattle traffic.

In the American plan of control two theories have been accepted as working hypotheses, namely, that a single tuberculin test is sufficient to detect all infected animals, and secondly that

all animals that react are immediately dangerous, that is, they are active in spreading the disease.

A long and careful study of tuberculin has shown that with a reaction there is present an active tubercular infection, but failure to react does not prove the absence of infection, for the disease may exist in the so-called period of incubation or its progress may have been arrested. In either instance it may develop later and perhaps rapidly destroy the animal. The criticisms against tuberculin are often based on a lack of knowledge of when it can cause a reaction and when it can not. Because of a neglect of these important facts herds have been tested once, the reactors destroyed, but no subsequent tests made to detect the possible recently infected or latent cases. These have developed later, the disease spread and the last stage of the herd has become more serious than the first. For this tuberculin has been unjustly blamed, for when properly used it is the most effective diagnostic agent known to the medical professions. To use tuberculin effectively the test must be repeated. In buying cows it is the sound herd from which to purchase rather than the non-reacting individual from the diseased dairies.

The other supposition that all reacting animals are immediately dangerous has also been a topic of much investigation. For several years I have been working on this subject. We have made single examinations of the milk and feces of a large number of reacting cattle and again we have made repeated examinations of the milk and excreta from a few cows extending over a period of 18 months at least. Our results thus far have shown that the milk of cows with udder tuberculosis contains tubercle bacilli usually in enormous numbers. It is stated that from one to three per cent. of tuberculous cows have the disease localized in the udder. In advanced pulmonary tuberculosis the bacilli appear in the feces and may occur in the milk through fecal contamination. In reacting cows in which no evidence

of tuberculosis can be found on a physical examination, tubercle bacilli have not been discovered in either the milk or the excreta. There are reports of investigations along this line that largely confirm these findings. If these results represent the facts generally, it will be possible to greatly reduce the number of tubercle bacilli in market milk by having the cows furnishing it given careful physical examinations at short intervals and all suspicious animals removed.

In Europe there are in operation at least three methods for the control of tuberculosis. The Bang method, named after its distinguished author, Prof. B. Bang, of Copenhagen, consists in eliminating all of the clinical cases, in testing the remaining cows with tuberculin, separating the reactors from the well and keeping them for breeding purposes. By this method the farmer is enabled to eventually build up a sound herd from the infected stock. In Denmark, however, the farmer is allowed to sell the milk from the reacting but clinically sound cows. This method has been applied in fully 10 per cent. of the dairies of Denmark. It requires rigid separation and frequent testing of the non-reactors in order to detect latent cases. Its great advantages are that it recognizes the rights of the cattle owners, educates them in the nature of the disease, enables them to build up sound herds and further it affords protection to the consumer in that it eliminates the bacilli spreaders.

The Ostertag method, generally recognized in Germany, consists in a thorough physical examination of the cows and the removal of all suspicious cases. Tuberculin may or may not be applied. If it is used the reactors are not separated from the others. The calves are raised tuberculous free by feeding them the milk from nurse cows. The animals are thoroughly examined at short intervals. The theoretical basis for this method is that the disease can be detected by a thorough physical examination before it has advanced sufficiently for the infecting bacteria to escape. Prof.

Ostertag states that the method, if rigidly carried out, will protect the milk from infection and eventually eradicate the disease from the herd. While it affords little or no protection for inter-herd control, it seems to be effective for intra-herd eradication. At our Veterinary Experiment Station we are now testing this method on a small number of experimental cattle.

The third European procedure is known as the Manchester method. It is used perhaps more than any other in Great Britain. It consists in making regular examinations of the market milk for tubercle bacilli. If they are found, the herds from which the milk came are carefully examined and the cow or cows eliminating the bacilli are found and excluded. This method seems to deal with the immediate dangerous animals only. However, Delapin of Manchester and Boyce of Liverpool report a far better condition relative to tubercle bacteria in the market milk of their cities than the health authorities of our large cities have recorded.

After carefully studying these various methods, discussing them pro and con with their authors and examining the herds in which they are being applied, one can not help but feel that in the eagerness to obtain absolute safety at once and to eliminate a great scourge from our cattle, the radical position taken by our people has tended to make progress slowly. Dairymen have objected to the slaughter of their best cows which appeared to be well, while they would not object to the removal of all clinical cases or suspicious animals. The experience with the Ostertag method in Germany can not be set aside without some reflection. The Bang method would perhaps be open to less objection in this country if dairymen could sell the milk from cows that have reacted to tuberculin, but which exhibit no physical evidence of the disease. At present our dairymen object to the Bang method because the milk can not advantageously be used.

To summarize these somewhat brief and fragmentary statements, there seems to be justification for the following conclusions, namely:

1. The frequency of tubercle bacilli in our market milk is due to the fact that there is no efficient method for the control of tuberculosis in operation in a large majority of herds furnishing milk to the cities.

2. The American method of control acceptable to our sanitarians and milk consumers is so severe in its operations upon the dairymen that they are not willing to apply it. The established methods in Denmark and Germany, which could be applied and which would give constantly increasing safety to milk consumers, are objected to because the cows under such control might respond to the tuberculin test.

3. The remedy seems to be in a more rational view of the situation and in utilizing the valuable feature in each of the methods. Dairies producing milk should be carefully and frequently examined by competent veterinarians and the suspicious cases promptly removed. Sound herds should be grown up to take the place of the infected ones. Tuberculin should be used, when possible, to hasten the result, and the reactors eliminated in as economical a manner as possible. The crux of the whole situation, as far as the protection of the milk consumers and the spread of the disease are concerned, rests in the detection and removal of the cows that are about to become spreaders of the specific organisms. For this we are absolutely dependent upon an accurate knowledge of the natural channels through which the specific bacteria are eliminated from the diseased animal and our ability and power to close the channels through which they gain entrance to the healthy individuals.

Tuberculosis is a parasitism that has come to be a great destroyer of man and of cattle but like other injurious agents it will disappear when people learn to avoid it.

THE AGRICULTURAL SIDE OF OUR FORESTRY DEPARTMENT

By Edwin Smith, '12

Michigan Agricultural College

EVEN though the Engineering student of the Michigan Agricultural College often claims that its title is a misnomer and just as often threatens to change it to "The Michigan State College," yet we hardly think that our Foresters would molest the name of their Alma Mater, the oldest school of its kind in the United States, since the work of growing and handling trees is so closely related to agriculture itself. So closely does it follow agricultural lines that the basis for the work is the same as that for the agricultural students until the beginning of the spring term of the Sophomore year, when the Forestry students take up the technical side of the subject and thus make a separation between the producers of fruit and animals and the growers of trees.

In more ways than this is our Department of Forestry linked with the interests of the farmer, for among its purposes there is one that is a direct benefit to him. Prof. J. Fred Baker of the Forestry Department says: "The purposes of the Department are two-fold. It aims to give the Agricultural students a working knowledge of how to handle their woodlots on the farm; and second, it endeavors to turn out technical men in forestry who expect to make forestry their life work." The latter group of men are graduated with the degree of Bachelor of Science and afterward fill positions such as city or corporation foresters or go into the service of the state or federal government, which pays \$1100.00 per year for the services of a forest ranger the first year he is in the service. The other group of students get an idea of how a farm woodlot may be utilized in other ways than that of a public hunting-ground.

This phase of the Agricultural student's college instruction is naturally very broad, and practical to the extreme. The aim of such an arrange-

ment is to give a general knowledge to the future farmer so that the farm woodlot may be so handled, as to give a continuous supply of wood and timber that is used by the farmer upon whose farm the woodlot is situated. Besides paying attention to the selection of sites, tillage, planting, cultivation and general care, the work embodies some practice in estimating tracts and harvesting the timber. For this the college forests are used as laboratories. The men are divided into squads and provided with chains, calipers, and field tally-boards. Taking a strip across the tract, the men handling the calipers call out the tallies to the headchainman, getting the diameter breast high of the various species of trees in the stand, taking measurements of one square chain at a unit. After ascertaining the average D. B. H. (diameter breast high) an average tree is selected, cut up and the number of feet computed in the average tree, and later of the whole stand. This and the Richt Height method are the only methods the Agricultural students become familiar with. In addition to this, various log rules are worked with so that if in after years the man taking this course lets someone else purchase a stand of timber on his farm for a small part of what it is worth it will only be due to the generosity of the farmer's heart, and not to his ignorance of the value of his property.

Through lectures and laboratory work an acquaintance is made with the species of trees that have economic importance in this region of the United States, so that enough is known of their botanical characteristics as to enable the student to easily identify our native trees, besides familiarizing himself with their geography, local occurrence, soils, growth, tolerance of shade, reproduction, diseases and uses of the wood.



STUDENTS THINNING WHITE PINE SEEDLINGS.

(The wind break seen in the background is twenty-five years old and over one mile long.)

A little study of the habits of trees gives a man a greater appreciation of the environment that surrounds him at all times and also gives to him, companions that he never could have known. Too many of our farmers of the present day go through life oblivious of many would be friends and companions. It is not necessary that the farmer should retain all of the botanical names of the trees, yet it is of no little importance that he should know what kind of a location the White Pine desires or what kind of a soil the *Catalpa Speciosa* thrives best in, for he may have a tract of abandoned land that would be home for the one and destruction to the other.

One important item considered, and one that all farmers should pay some attention to, is the growing of trees for fence post timber. Many men have five, ten, or fifteen acres of side hill or lowland, returning little or nothing in way of pasturage, which land, if converted into a systematic woodlot would pay nearly as well as the more desirable portions of their farm. To illustrate this we will consider a tract of Locust or Catalpa

which will produce a post 6 inches at the butt, 4 inches at the top and eight feet long in ten years. It requires 2722 trees to set one acre, setting the trees four feet by four feet. The Department of Forestry furnishing the nursery stock to the farmers throughout the state for the actual cost of production, the cost of foresting one acre would be as follows:

2722 Nursery Trees at \$3.00 . . .	\$8.16
3 years Cultivation at \$1.50 . . .	4.50
Preparation of Land at \$5.00 . .	5.00
Planting at \$2.00	5.44

Cost per acre \$23.10

At the end of ten years we get 2500 posts which will bring 10cts. each on the stump. This would be an income of \$250.00 minus \$23.10, cost of foresting, or \$226.90 per acre for ten years, which will equal \$22.69 per year. This would be equivalent to raising nearly thirty bushels of wheat per acre, with but a minimum of labor and worry.

Attention is also paid to the seasoning of timber and the preserving of posts in creosote before setting them. This is an operation which, as has been



THE PINETUM AT MICHIGAN AGRICULTURAL COLLEGE.
Planted by Dr. W. J. Beal in 1897.

shown by the various Experiment Stations, increases the life of a post's usefulness from two to three times and one that costs only from five to eight cents per post.

The above serves to illustrate that the coal mines of Alaska, the swift-flowing streams and waterfalls of our mountainous regions and the immense forests of the Rockies do not possess the only opportunities for the present day eagerness for conservation; but that in such a thing as an insignificant, weed-hidden chunk of lowland on the back part of the pasture lot, dollars are yearly going to waste, and all for the same reason that fires are making nude the hills that feed our large rivers, the reason some call neglect. But it is not altogether due to neglect for in some degree it is due to lack of knowledge. We must know something of trees, their habits, their relative qualities and their characteristics before we can conduct a systematic forest management in the woodlot, just as much as men need to be trained to protect the forest wealth of the West.

We have all read of how German

forests not only are keeping up the supply of timber in that country but are actually paying the expenses of government of those localities that maintain a state forest. Michigan's plan to help her forestry conditions lies not only in reforesting cut over areas and promoting a wise handling of the forest areas within the boundaries of the state, but also in influencing the farmers to carry out private systems of forestry for home consumption. To do this the Department of Forestry not only furnishes education but maintains a forest nursery for the purpose of supplying farmers with desirable nursery stock at a minimum cost.

So in this province, the instruction of the Agricultural student, lies one of the minor, yet significant means by which our Forestry Department is seeking to help to solve the great forestry problem. It not only means more utility of the farmers land, but means a cessation of the neglect that the country people have been showing the opportunities for pleasure and profit that lie in their surroundings. It is one step towards Conservation.

FOREST REGULATIONS IN ONTARIO

By A. E. Parlow

Forestry Student in the University of Toronto

ALL the land in the Province of Ontario belonged originally to the Crown, and in the case of woodlands, the right to cut only, is sold; the title to the land itself remaining in the Crown. In buying a "limit," there are three payments; first, a "bid" made at open auction, called a "bonus," second, "dues," according to the amount cut. This is determined by government scalers. Third, "ground-rent" per square mile per year. Formerly there was no time limit and the holder of a large tract by regulating his cut by the annual increment, could cut the same tract over again and again, thus paying for his lumber a merely nominal ground rent but now the licensee has a certain number of years to get the stuff off.

The Ranging System of Ontario was established in 1855, as an experiment, when a few men were placed on licensed land as fire-warders. Prior to that, there was an Act to protect forests on the Books but it was not enforced. The men were chosen by the licensee and their salaries were paid, one-half by the licensee, and one-half by the Government.

Later the Government found it necessary to assume the power to appoint men on lands where the licensee failed to do so, charging the expense of the same to the holder of the license.

*"This action was taken because it was not fair that the man who policed his own territory well, should be exposed to danger from fire running in from an adjoining limit, the owner of which was either too parsimonious or too careless to put on the necessary rangers." The Government was also to supervise the work of the men in the field and make sure that they did not undertake any other employment while on duty as "rangers."

Settlement, survey parties, railway construction and the discovery of

great mineral wealth sent thousands of men into the "bush" in Northern Ontario and all these men carried fire with them, so it was decided to extend the Ranging Service to the unsold territory of the Crown, and men were placed along the railways. These men were supplied with railway velocipedes, with which to cover their beats. Men were also placed along the important water-ways and canoe-routes. On the unlicensed land, the entire cost of the Service fell, of course, upon the Government.

The men are sent out in couples on both canoe and land-patrols, and are supplied with a complete outfit, consisting of a canoe, a 7 x 7 tent, three pairs of double blankets, a rubber sheet, shovels, buckets, axes, and a cooking outfit. They are given printed copies of the "Fire Act," and cotton posters with the Act and the Game Laws, for the Fire Ranger is Game-warden as well, and these posters are tacked up in conspicuous places. Then, too, there is a little red Diary in which the weather, the Ranger's daily movements and any unusual incidents are noted, and which must be handed in at the end of the Season.

Last year, 1910, there were over nine hundred men in the Service, divided about evenly between canoe and land-patrols. Four hundred and sixty of these were on unlicensed land and the cost to the Government in wages alone was about two hundred thousand dollars. They are paid two dollars and a half a day, for seven days in the week, and board themselves, going into the "bush" in May and coming out about the thirtieth of September.

A new agreement has been reached within the last few months by means of which the entire cost of ranging in the licensed territory, falls on the license holder, on the understanding that ground-rents, which recently jumped from a dollar and a half to

*From Report of Minister of Lands, Forests and Mines.

five dollars a year, shall not be raised again for ten years.

During the season of nineteen ten, there were three hundred fires set out that were traced to locomotives, and it is expected that more stringent legislation will soon be enacted regarding the liability of railway companies. Under the present law there is a penalty, "not exceeding \$50.00 or three months in the common jail," for setting fire in the case of individuals, and of \$100 for each offence in the case of railways. This has not proved satisfactory.

In the coniferous forests of the "north country" fire sweeps through a stand very rapidly and fiercely, killing all growth but leaving standing timber dead, yet sound, which can be cut within two or three years of the burn, after that, insects and rot commence. For the lumberman, in many cases such a fire is not very serious, but on the other hand, the young stuff, which is to replace the present stand is killed, the earth and humus, the product of centuries of weathering and accumulation is destroyed, and one fire usually

being followed by another, the district becomes a veritable wilderness.

Fire-fighting is difficult always and especially so in sparsely populated districts. Two men cannot stop a forest-fire, but two experienced, watchful men may often head off small fires before they attain dangerous proportions, and in case of larger fires, can call out men and take charge of the fire-fighting operations. In such cases the Rangers have the powers of a constable in pressing men into the Service, and afterward send through their chief, vouchers, to the Department for wages of the extra force.

It is impossible, however, to police so vast a territory thoroughly, and probably the most valuable service performed by the Ranging System, is its educational function. By placing posters where they will be seen and read, by warning campers, settlers and others of the danger of fire, by distributing printed copies of "The Act" and by their mere presence, they are slowly helping to mould public opinion, which is after all the best safeguard.



TYPICAL FOREST ON THE YUKON FLATS ABOUT TWENTY MILES BELOW FORT YUKON ON THE ARCTIC CIRCLE. TIMBER CHIEFLY WHITE SPRUCE, TWO TO EIGHT INCHES IN DIAMETER AND UP TO FIFTY FEET IN HEIGHT; SOME BALSAM POPLAR AND LARGE WILLOW.

Reproduced by permission of U. S. Forest Service.

SOME SUGGESTIONS AS TO HOW A YOUNG MAN WITH NO CAPITAL MAY GET STARTED IN FARMING

By G. F. Warren

Professor of Farm Management and Farm Crops, Cornell University

FARMING in America is rapidly changing from an occupation, to a business. Formerly only a few cheap tools and a team were required. Farming was much like teaming or any other occupation requiring little capital. Men frequently shifted back and forth between farming and other occupations. The introduction of machinery has gradually take farming out of the mere occupation class, and placed it in a class with other kinds of business that require the permanent investment of considerable capital. The change has been most rapid during the past ten years.

Some types of farming are less affected than others. The milking of cows and the growing of some kinds of vegetables are still in the hand labor class. Some farmers still cultivate corn with one horse and dig and plant potatoes by hand, but their number is rapidly decreasing. Every farmer, who adopts a desirable new machine, makes it harder for the one who depends on hand labor to compete.

More horses per man, more and larger machinery, all call for larger farms. The area farmed per man is rapidly increasing in all parts of the United States. This accounts for decreases in rural population in New York, Iowa, Missouri and other states. It accounts for empty farm houses. Each farmer in America is farming more land than was farmed by one man ten to twenty years ago, and is at the same time increasing the crop yields per acre. Crop yields in the United States are increasing, not decreasing as is commonly assumed.

When all these conditions call for so much capital, can a young man with no money hope to earn a farm in a reasonable time? The road to farm ownership is not closed but there have

been changes in the best method of travel. More time and effort are required than formerly, but a well equipped modern farm is worth time and effort.

FIRST, GET AN EDUCATION

The first step that a young man should take is to secure an education. The chances are that by this means he will actually own a farm sooner than if he at once sets out to get one. The figures from the agricultural survey are significant.

RELATION OF EDUCATION TO PROFITS

Education	Number of Farms	Average Labor Income ¹
District School.....	398	\$318
High School.....	165	622
More than High School	10	847

¹ Labor Income is determined by subtracting the farm expenses and 5 per cent. interest on the capital from the farm receipts.

A high school course is worth more than an investment of \$6000 in five per cent. bonds. We do not have figures for a large number of college men, but a college course seems to be worth as much more. Time spent in school seems to be worth about \$7 per day to a farmer.

Anyone can check these ideas if not the figures. We hear men regretting all kinds of acts. Those who have cows are sorry that they did not plant orchards. Those who have orchards wish that they had different varieties. Those who went West wish that they had gone South. Those who are not married wish that they were married and sometimes those who are married wish that they were not. But who ever heard of a man wishing that he had not gone to school so long? Franklin was right when he said that an investment in knowledge pays the best interest.

THE FIRST START IN FARMING

For a farm boy without an agricultural college education, the best way to start is as a hired-man. If the neighborhood is a prosperous one, that is the place to begin, if not, go where farmers are prosperous. By working from two to five years, he may save enough money to become a tenant. If he has proved himself both worthy and efficient, he will have no difficulty in renting a good farm.

In whatever position one is working, he should strive to earn at least twice what he gets. Men do not buy cows, land or labor unless they expect to make a profit on it. If one gets all he earns, why should any man desire to hire him? When the salary is raised, it is not because the employer thinks that the increase will be earned, but because it has been earned. This holds true on farms, in shops, in universities, everywhere, one must always earn his increase in pay before he gets it.

A graduate of an agricultural college who has grown up on a farm can usually start best by teaching, in experiment station work or as a farm manager. By taking the best position available, when experience, opportunity and salary are all considered, he should be able to save more in a year than the farm hand receives.

A position that calls for travel and study on farms is very desirable for one or two years. A place as farm manager on a real farm is good both because of the experience and the low expenses. Some of the best paying positions are as managers of estates. The experience gained on such places is often harmful. If any ideas are gained, they are likely to be extravagant notions that are adapted to spending money—not to making money.

The college graduate usually skips the tenant stage. In such cases the farm should be bought as soon as one has money enough to secure the place on contract or by part payment. The farm is then rented while one continues in his position. In this way a farm may be bought long before it

could possibly be purchased if one were to attempt to equip and run it. The salary should usually pay the interest and some of the principal. The rent may be applied on the principal. Either the salary or rent should pay the interest. It is not likely that both will fail in the same year. If one were on the farm and had a crop failure, he might lose the place. When the farm is largely paid for, one may move onto it. This is the plan followed by nearly all the men who wish to farm and who are in experiment station and government work.

One great advantage of buying a farm as soon as possible is that it ties one to the land. A salaried position may wean one away from the farm. The farm furnishes a place to spend vacations. It forces one to economize in his youth. There is a general tendency for land values to rise. If wisely chosen, the rise in value of the farm may be equal to the interest.

The first farm purchased need not be the one on which the final home is to be made. If it is a good investment, it may be sold and a larger and more desirable place may be purchased.

In choosing a farm, productive soil is the first consideration. It rarely pays to work a farm that is not located in a prosperous community.

STARTING AS A TENANT

If one becomes a tenant in the progress toward ownership, the following tables may be of interest:

RELATIVE PROFITS OF FARMERS WITH SMALL CAPITAL AS OWNERS AND AS TENANTS IN TOMPKINS COUNTY

Capital	Average labor income Farms operated by owners	Per cent. making labor incomes of over \$600
\$3000 or less	\$225	3%
3000—4000	242	10
4001—5000	339	15
5001—6000	459	32
over 6000	673	45

131 tenants with capital of less than \$3,001, averaging \$1,187, made an average labor income of \$367 and 15 per cent. made over \$600.

It appears that one should remain a tenant until he can command at least \$5000 capital. Of this perhaps one-third might be borrowed. It is much better to be a tenant on good land than to be an owner of poor land.

Cash rent is much better for the tenant than is share rent. If you own a farm, as a landlord, it is better to give it the additional attention required and rent for a share, but if you are a tenant, it is best to rent for cash.

RELATION OF SYSTEM OF RENTAL TO PROFITS

	Tenant's labor income	Landlord's per cent.
Cash.....	\$604	5.2%
Half of crops.....	467	12.4
Half of receipts..	342	9.0

OWNERS RENTING ADDITIONAL LAND

	No. of farms	Acres owned	Acres rented	Labor income
Owners operating their own farms only.....	529	105	0	\$407
Owners renting additional land.....	86	89	51	522

TYPES OF FARMING WITH SMALL CAPITAL

When one is very short of capital, he should make very few long time investments. Planting orchards, putting in tile drain, raising colts, expensive cows, should not be taken up too quickly. All these may be the best possible things when money is available, but when the interest must be paid next fall, quick returns must be secured. Second hand machinery may be purchased, and the more expensive tools be hired. Paint is one of the last of the desirable investments.

Of the farmers in Tompkins County who operated their own farms and who had less than \$3000 capital, five made labor incomes of over \$600, the highest

No tenant should ever milk poor cows on shares. It is bad enough to raise poor crops. If a landlord furnishes half the feed and cows and gets the manure and \$5 per cow above the cost of feed he may be making money. But in this case a tenant gets only \$5 for his labor of caring for a cow a year. It takes good cows to pay a tenant, poor ones may pay the landlord.

PART OWNER

If one is farming with too small a capital, he may often own part of his land and rent a part. This is a plan followed by very large numbers of farmers who are short of capital. How successful it is, is shown by the following table:

was \$794. Three of these worked additional land on shares. Of the farmers with \$3000 to \$4000, ten made labor incomes of over \$600, the highest was \$800. Potatoes, hay, eggs were the chief sources of income on these farms. Dairying usually requires more capital. The cash crops that bring quick returns are the ones that have paid such persons best. A better way is to rent additional land.

It now takes longer for a hired man or a man on a salary to earn a farm than it used to, but the farm is now much more worth while. Any young man with health and energy can earn a farm. Probably he can earn it as soon as he could secure an equally desirable business in a city.



LITTLE FISHES IN THE BROOK

By L. H. Bailey

THE farmer is rapidly developing new points of view on all his operations. Many of these changes have been so radical as to surprise everybody. Some persons seem to think that we have now torn up and challenged everything, and that the farmer may hereafter abide in peace. Some of us know that this is not so; and I was specially impressed that it

at a rational conception of the subject. Our fish-hatchery system is developed on the science of the past generation, and it is now inadequate. It proceeds on the principle of breeding numberless fry and then placing them wholesale into ponds and streams that may be inhabited by all kinds of fish and that may present all kinds of conditions. The result is



FIG. 1.

One of the staple forage crops of inland waters. A "fresh water shrimp," *Gammarus fasciatus*. Of great hardness, but of rather slow increase.

is not so when Dr. Needham dropped into my office the other day and began to talk about fish. His conversation interested me so much that I called the stenographer and jotted some of it down; and here it is.

DR. NEEDHAM TALKS ABOUT FISH.

We shall come to the time when the farmer must use his streams and ponds for the rearing of fish. The farmer ought to raise his fish just as much as he raises his pork.

We do not yet have sufficient knowledge to enable us to give exact advice as to how the farmer is to rear food fish, but we know enough to realize that we have not yet arrived

that a very small proportion of the implanted fish survive to maturity. Many fish are carnivorous and eat their young. It is not profitable to feed big fish on little fish, any more than it is profitable to feed big pigs on little pigs.

In the early days we allowed our pigs to roam over square miles of territory. They lived as best they could on what they could pick up. At present, we confine our pigs in small areas and grow the food for them on other areas; and we have more pigs and better pigs than we had before. Similarly, we must now begin to control and domesticate our food fish. Most farms in the East

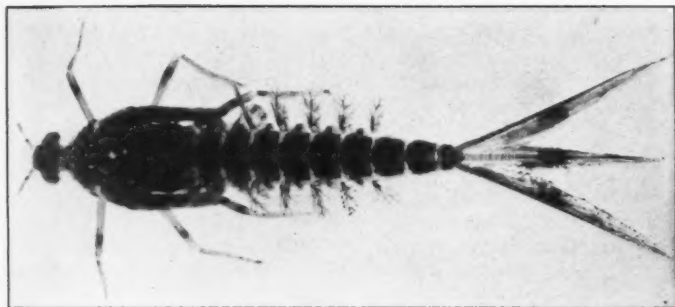


FIG. 2.

A new crop being raised at the C. U. Biological Field Station, a may fly nymph, *Callibaetis fluctuans*, a choice fish food, of enormous reproductive capacity. The offspring of a single pair during one season may number 125,000,000,000.

have creeks or ponds, or places where ponds could be made. These ponds and pools should be cleaned of all fish except the kinds that are to be grown; and the food for them should be produced in other ponds alongside and which are connected with the fish-pond. In the future it will be just as necessary to raise the proper food for fish as it is to raise the proper food for pigs. We have only begun to study the question of natural fish forage. Of course, we can feed fish on purchased cereal food, but this is expensive, and the practice is just as irrational as it is for a man to buy all the feed for his pigs or his cows. The vegetable matter, May flies and other organisms that fish eat may be isolated and grown in pools and ponds particularly adapted to them, in the same way that potatoes are grown on fields that are adapted to potatoes and prepared for them.

In the old days it was sufficient merely to grow pigs. They might be razor-backs or anything else. At present, we are growing different breeds of pigs, one kind being adapted to the making of bacon, another to the production of hams, another for lard, and so on. Just as consciously must we breed varieties of fish. With the exception of some varieties of carp in the Old World, we have no domestic breeds of food fish. There is

every reason to expect that from our bass, our perch, our cat-fish tribes, and others, we can develop forms that will be specially adapted to different conditions and to domestication.

Having ponds regularly prepared for fish and adapted to them, and having developed varieties or breeds for particular conditions and uses, we shall plant our ponds with fish as rationally and as carefully as we plant our fields with corn. If a farmer were to scatter his seed-corn broadcast throughout the woods he would not expect much of a crop; and yet we throw our fish fry into ponds that may be just as poorly adapted to the growth of these fish as are the forests for the growth of corn. Our fish-hatcheries and the stocking of ponds now proceed from the sportsman's point of view. All this antiquated method must go, and we must begin to rear fish as accurately as we rear fowls.

We shall recognize that there is property right in fish, just as there is property right in pigs and sheep. We shall not allow fishers to fish everywhere indiscriminately just because they happen to find a piece of water in which fish live. They will be allowed to fish only in public waters. The farmer will raise his own fish in small ponds and he will have a right to all that he raises.

It will not require a very large pond to supply a family with all the fish that it wants. It ought not to be more trouble or expense to handle a farm fish establishment than to

handle a farm poultry yard or a drove of pigs. We shall find in time that an acre of water may be more profitable than an acre of land.

THE POLICY OF THE LEHIGH VALLEY RAILROAD IN AGRICULTURAL DEVELOPMENT

By F. R. Stevens, Agriculturist

THE type of railroad development is to a certain degree changing. Instead of extending into more territory, the roads are taking up the question of internal development and economy. In endeavoring to accomplish this the various roads have adopted plans differing widely from each other.

The plan of the Lehigh Valley Railroad is substantially as follows. An agriculturist was appointed in the Department of the Industrial Commissioner and he is called into consultation on such purely railroad problems as the placing of sidings, spurs, etc., in agricultural territory, the care of farm lands, purchased incidentally in acquiring right of way, care of live stock owned by the Company and minor matters of this type. His principal duties are to assist, in every way possible, in the development of the farms in the territory which contributes freight to the road. In doing this it is almost needless to say that no attempt has been made contemplated to change the type of farming for the purpose of securing crops which will give more freightage. The foundation principle on which the road acts, is that the prosperity of a railroad is measured by the prosperity of the people living along its line. The efforts then of the Agriculturist have been to assist the farmer in each case, to develop along the line of his own inclinations or local advantages.

On invitation of any grange or other farm organization, or that of some prominent farmer, a meeting is called,

in the locality, at which the Agriculturist is present and discusses some phase of agriculture of particular interest to the people in that locality. These meetings are as informal as they can be made. A large portion of the time being given up to discussion of questions at hand and as only one topic is usually taken for an entire session, plenty of time is given for free discussion after which those farmers who desire more definite information regarding their places, hand in a slip of paper, giving the name and the location of their farms and at the earliest possible opportunity, the Agriculturist visits the farm and discusses these questions in detail.

The problems most commonly brought out by the farmers are: how to grow alfalfa, the best rotation of crops, questions on the use of commercial fertilizers, care of orchards, including identification of insects and other pests and the question of effective rations for feeding animals. In answer to each of these, the farmer is asked to try a small plot in manner outlined by the Agriculturist and watch developments. If it be the question of alfalfa, he is urged to try half an acre or an acre in manner prescribed and to watch results. In the matter of fertility, he is asked to try a small plot, divided into sections, each treated with different chemicals to bring out the needs of his soils and so on with the other problems. No radical change, on a large scale, is recommended until, by thorough ex-

periment and test, the farmer himself is actually in possession of the foundation principles and is ready to go ahead on a large scale on his own initiative. The representative of a railroad is in a different position from the representative of a state or municipality in that he has no known or suspected power of enforcing his ideas as to any particular manner of doing things. In fact, save for the invitation of the farmer, he is a trespasser. This very condition seems to be an advantage rather than a disadvantage.

If there is any one subject which has been given more consideration than any other, it is the alfalfa problem. In the great dairy district along the line of the Lehigh Valley Railroad, it seems almost a necessity that the farmers should have a large quantity of alfalfa in order to produce milk economically and in the

districts where fruit and grain are the principal crops, alfalfa seems much more profitable to sell for hay than any other grass that can be grown. In addition to these two reasons, it has been found that while we have for years, urged a farmer to turn under large crops of clover in order to promote soil fertility, that the temptation to cut a crop of clover and put it in the barn, has been too great and the turning under of clover has not been as general a practice as it should. When, however, he has on hand, all the alfalfa hay necessary, then the turning under of clover will be a fact rather than a theory and this will make a basis for a more profitable rotation of crops with an increase in productivity on each.

This department has been in existence now less than a year. The work, has, each month, increased in volume and we hope, in results.

SOIL FERTILITY

By Milton Whitney

Chief of the Bureau of Soils, U. S. Department of Agriculture

SOIL, as the term is used in Agriculture, usually refers to finely divided mineral particles with more or less plant remains mixed with it. Sometimes, as in the case of some peat soils, the mineral particles may be absent, but in this case mineral matter is present in the plant remains. But finely divided mineral matter does not function as a soil until a living plant or dead plant remains are fed to it; so that we cannot conceive of a soil without plant remains.

The soil has certain physical properties of texture, structure and material simulating in a degree the anatomy of a plant or animal. It has digestive and nutritive functions, and in a sense, a circulatory system.

These functions are largely interdependent and not independent variables which make the problem of investigating the cause of infertile soils seemingly very complicated were it not for our knowledge of physiological

chemistry and the recent advances in the chemistry of nutrition and disease in animals and man. In fact, the chemistry of the soil is coming more and more to run parallel to the chemistry of nutrition and disease in man. The same or similar products of degradation of organic matter are being found as constituents of the soil humus as are found in the tissues of plants and animals. As we are coming to see that different races of man and different types of man, as well as different breeds of animals, differ fundamentally in the normal way they function and that in each there are abnormal functions which manifest themselves as more or less well recognized cases of disease, so we are coming to see that the different types of soils have normal differences of function which adapt them fundamentally to different crops and crop associates and rotations, and that they frequently exhibit abnormal functions

which render them ill adapted to the service we would otherwise expect from them.

Cultivation, cropping and fertilization undoubtedly may have a profound influence upon the functioning of soils as work (exercise) and proper care have upon the functioning of man and animal. It is easy to conceive that by improper methods of control a soil may be abused and made for a time unproductive and on the other hand it is easy to understand why under more intelligent control, the soils of Japan have for at least 6,000 years maintained a much denser population than our own country. The Japanese value an old soil more than they do a new or virgin soil because the old soil is better understood and more subject to intelligent control. As far back as records and statistics go (about 300 years) the yield of crops on the old soil of Europe and for the past 40 years the newer soils of our own country have been increasing in crop productivity.

Modern soil researches have shown that old soils (long under agricultural

occupation) contain by actual analysis today as much of the mineral elements of all kinds as the newer soils of this country and modern soil philosophy cannot conceive of the normal soil in place becoming exhausted below crop requirements of any mineral substance requisite to crop production. Those who have for so long held to the mineral theory of infertility and of the food value of chemical fertilizers to replenish the supply of minerals removed by the crop have singularly overlooked the fact that, as shown by the recent compilation of the results of over 20,000 fertilizer tests made by the Experiment Stations in this country, mineral fertilizers are equally effective on rich lands as on poor lands although they may not show such relative differences in yield.

To my mind there has come a time when there is a great future in sight for soil investigators, as the economic results which have already been achieved are sufficient to base upon them a rational practice of agriculture and a rational system of diagnosis and treatment of soil abnormalities.

FORESTRY IN ALASKA

By B. E. Hoffman

Forest Assistant, Ketchikan, Alaska

IT is a general opinion among those who have never been to Alaska that it is entirely a land of snow and ice. This impression is entirely wrong regarding the southeastern and southern portion at least, because the wooded areas include practically all of these portions of the territory. The Tongass National Forest contains an area of approximately fifteen million acres and it includes nearly all of Southeastern Alaska. The Chugach National Forest situated on the southern shore of the main body of Alaska contains an area of approximately eleven million acres. It is evident that the acreage is very extensive and the ordinary countryman might think that there should be an inexhaustible quantity of timber, but the greater

portion is scrubby and of no value except as a surface protection to the watersheds and moderate mountain slopes. Another unfavorable condition to be found is the abundance of fungi, and consequently an excessive amount of defective timber.

Generally speaking, that portion of the Forest having any commercial value terminates at an elevation of twelve hundred feet. Western Hemlock makes up approximately 65 per cent of the stand, Sitka Spruce 20 per cent and the remainder Yellow Cedar (*Chamaecyparis Nootkatensis*) and Western Red Cedar (*Thuja plicata*). Practically every stand that is of sufficient size for saw timber is over mature and one is safe in saying that this condition is partly responsible for



WESTERN HEMLOCK FOREST NEAR KETCHIKAN. TREES RANGE IN DIAMETER FROM TWELVE TO TWENTY-FOUR INCHES, AND IN HEIGHT FROM SEVENTY-FIVE TO ONE HUNDRED FEET.

Reproduced by permission of U. S. Forest Service.

the large amount of disease. About the greatest obstacle in the eye of the lumberman or Forester at the present is the excess of Hemlock. This species is practically all affected by several species of fungi and the trunks are almost invariably fluted and irregular. However, the Hemlock is used more extensively for piling than any other tree as it withstands attack of the ship worm (*Toredo navalis*) very well. Spruce is the most valuable of all the Alaskan trees as its generally straight soft fiber makes it very valuable for building and box purposes. It forms approximately 95 per cent of the sawtimber cut. Yellow Cedar is one of the very best of woods for interior finishing and cabinet work, yet it occurs in such small quantities that it is of little importance, at present, to the lumberman.

Lumbering in the past has ranked second to the fishing industry and as the demand for boxes in the latter mentioned business is increasing, the two will, I believe, continue growing and working together. Logging up to the present time has been done principally by hand and there are still a

number of natives logging by this simple method. Such opportunities where scattering trees could be obtained along the shores with little effort and expense were ample means for the natives to earn a living while not engaged in the fishing industry. As the merchantable timber on the shore line grows small, and the demand for sawtimber increases, there comes a search up the river valleys and remote regions for steam logging chances. Steam logging outfits have been introduced for several years, but not extensively until the last one or two years and the scattering tracts of valuable spruce are rapidly being exploited. The principle of Forestry practiced in the administration of this forest in the past and present are timber sales, the annual cut of sawtimber on the Tongass Forest being an average of 17,000,000 board feet. This is a very small cut in proportion to the large area and it is estimated that a cut (under careful supervision) of 40,000,000 board feet would be a proper size to improve the Forest conditions and maintain a sustained yield.



GENERAL VIEW OF SHORE FOREST AFTER CUTTING OF RAFT. STANDING
TIMBER CONSISTS OF SITKA SPRUCE, WESTERN RED CEDAR,
AND WESTERN HEMLOCK.

Reproduced by permission of U. S. Forest Service.

The work of the field force is somewhat different from that in the United States proper. Owing to the excessive rainfall there are no fires to contend with and grazing is entirely absent. The mode of transportation is necessarily by water as the greater portion of the forest is islands. A gasoline launch with very comfortable quarters is kept throughout the year traveling from place to place wherever work is to be done. Timber scaling and estimating takes up a greater portion of the time, although there are a few special uses and Homesteads requiring attention every year. Forestry in the future on these two

forests will progress in a very similar manner to which it has in the other parts of the country. In the immediate future more detailed timber reconnoissance and plans of management will be carried on and the lumbering industry will develop to a higher standard.

Many citizens cast criticisms on the Service and declare that it serves a nuisance in bottling up wealth, but as time passes and conditions change, the critic is taught the great responsibility resting on the inadequate force of managing the valuable resources with which we are entrusted.



The Cornell Countryman

S. G. JUDD, Editor

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APRIL, 1911

Fish Cultivation

From pre-historic times men have looked upon the fishes which live in our waters as their legitimate prey.

Similar to the conditions which have threatened our wild game with complete annihilation, fishing, particularly in our inland waters has degenerated from the quest for food to mere "sport." We have before commended real sport but we deplore any policy that disregards the future.

It is true that our streams and ponds have been stocked with artificially hatched fry but this work has always been conducted from the sportsman's view-point. An altogether novel yet broad conception of the problem of fish conservation is presented in this issue by the article, "Little Fishes in The Brook." Instead of dumping numberless fry indiscriminately into our streams and ponds without any regard for adaptability to environment we should consider it from the point of view of food production, the same as we look at the

production of beef or pork. By cleaning out of these bodies of water the undesirable species of fish and then cultivating desirable species, feeding them if necessary, the neglected ponds and streams of our farms will become producers of a considerable amount of very desirable food.

This outlook opens up a large field of experimentation. This spring the College of Agriculture expects to start experiments along this line in the upper waters of Cascadilla Creek. We shall watch their progress with great interest. We offer enthusiastic co-operation.

Canadian Reciprocity

During the past winter discussion of "Reciprocity with Canada" has been heard at all times and all

places. The CORNELL COUNTRYMAN hesitates to take up a subject over which the opinion of the nation seems so widely scattered. However, the agricultural interests of the United States seem to be unanimously against this measure. THE COUNTRYMAN takes its stand with them.

We call the especial attention of our readers to the resolutions adopted by the National Grange concerning Canadian reciprocity, which are printed in the columns of our *General Agricultural News*.

Any measure which continues a tariff on manufactured articles while putting raw materials, the farm products, on the free list is manifestly unfair. Never until the present time has the farmer received prices anywhere near the value of his products. This reciprocity bill, if passed, will bring prices back again to the old unjust basis. At the same time the farmer must continue to pay high

prices for all manufactured products.

This proposed measure is not real reciprocity. We urge the American farmers to stand united and to make strong protest against its enactment.

Phytopathology

We have recently received a copy of a brand new magazine, *Phytopathology*, which is to be the official organ of the American Phytopathological Society. This first issue contains forty pages and cover with additional frontispiece (an hitherto unpublished photograph of Anton de Bary, father of Plant Pathology), and presents altogether a very pleasing appearance.

An editorial announcement states, "This journal is designed primarily as a channel of publication for the phy-

topathological contributions of the members of the Society. Much of the space will naturally be occupied by the papers read at the Society's meetings. The editorial policy, however, will aim to make the journal more broadly representative than this and we hope to deserve and receive the subscriptions and support of all who are interested in the study of plant diseases."

One of the three editors of *Phytopathology* is Professor H. H. Whetzel, while the business manager is Professor Donald Reddick, both of our own Department of Plant Pathology. Thus, we have more than a passing interest in this new magazine which has its home at Cornell. Any organization that includes on its executive staff Professors Whetzel and Reddick is sure to advance. **THE COUNTRYMAN** predicts for *Phytopathology* a brilliant future.





CAMPUS NOTES

In the Intercollege Carnival of Sports held in the Armory, Saturday, March 18, Agriculture won first place and with it a lead of six points for the Intercollege Championship. Those who won points for Agriculture were as follows: T. E. Milliman, first in obstacle race; S. A. Miller, third in rope climb; G. U. Tiffany and F. E. Rogers, second in the elephant race; G. U. Tiffany, first in the sack race; G. U. Tiffany and F. E. Rogers, second in the three-legged race, and T. E. Milliman, W. R. Wilson, F. J. Burgdorff, L. M. Hayes, L. C. Treman, C. E. Riker, E. V. Hardenburg, and R. T. Burdick, first in the intercollege relay race. In the rooster fight, two Agricultural teams, E. V. Hardenburg and H. G. Honeywell; and Isador Selecter and E. A. Stevens, stood after all others had fallen.

* * *

On Friday, the 17th, the Farmers' Institute Workers of this state met here at the College. At one o'clock, Farmers' Institute lecturers, and representatives of the State Education Department, members of the College faculty and several of the Geneva Experiment Station staff, who have assisted in institute work, sat down to a dinner prepared by our Home Economics Department.

Following the dinner were some very interesting toasts. Mr. Jared Van Wagener, Jr., Institute Conductor of Lawyersville, N. Y., presiding as toastmaster. The first speaker of the afternoon, Hon. R. A. Pearson, N. Y. State Commissioner of Agri-

culture, discussed the "New Policies of Institute Work in New York State." Other speakers who followed were: Dean Bailey, Dr. W. H. Jordan, Director Geneva Experiment Station; Hon. D. P. Witter, Institute Conductor of Berkshire, N. Y.; Miss Bella Millar, Institute lecturer; Mr. A. J. Merrill, N. Y. State Education Department; Mr. F. G. Helyar, Director of the School of Agriculture at Morrisville, N. Y.; Prof. James E. Rice, of our Poultry Department; Miss Martha Van Rensselaer of the Home Economics Department; and Mr. Royal Gilkey, Assistant N. Y. State Department of Agriculture.

The purpose of this meeting was to enable those connected with Institute work to get together so as to discuss future policies of the work, and also, that the various workers might become better acquainted with one another. A similar meeting is held each year at the close of the winters' institute work.

* * *

Prof. Gilbert spoke at the following Farmers' Institutes during March: Berkshire, N. Y., March 14; Claverack, N. Y., March 9; Elmira, N. Y., March 11; Alfred, N. Y., March 2.

* * *

Dr. Webber was a speaker at Farmers' Week of Massachusetts Agricultural College, March 14.

* * *

A corn growing contest has been instituted among the boys of Elmira and vicinity. This contest will be under the general direction of Dr.

Gilbert. Four lectures on corn growing have been arranged and a corn show will be held at the Chemung County Fair when prizes will be awarded. These prizes consist of free trips to Cornell, the Experiment Station at Geneva and to Albany.

* * *

A corn germination contest has been arranged among the school children at Berkshire, Tioga County, by Dr. Gilbert. A prize will be given to the boy or girl who writes the best essay upon his results.

* * *

During the week of March 20th, members of the Department of Entomology visited Batavia, N. Y., where they decided upon the location of the experimental orchards for the Batavia Bethany Fellowship in Entomology. This fellowship was established by Mr. R. W. Braucher.

* * *

The Department of Entomology has received power sprayers from the Hardy Mfg. Co., of Hardy, Mich., and from the Friend Mfg. Co. These outfits are to be used in spraying the elms on the campus for the elm leaf beetle, which has been a serious pest for the past few years.

* * *

The Campus Club held its regular meeting on March 16, as guests of the Department of Home Economics.

* * *

On March 17, the Institute Workers on the State held their meeting at the college. They were entertained by the Department of Home Economics.

* * *

The Clinton County Extension School, the second of the kind run by the college, was held in March at three different places in Clinton County. At West Chazy from March 13th to 18th, Professor Stone, Mr. Cross and Mr. Ayres were present. On the next week the session was held at Saranac. Professors Stone and Harper, and Mr. Ayres attended this week's session. On the third week the session was held at Peru, and was attended by Professors Wing, Stocking and Stone. The

studies were carried on by means of lectures and laboratory periods.

* * *

On the evening of Wednesday, March 15th, the Freshman Class in Agriculture held a well attended meeting in the Auditorium. Mr. C. F. Ribsam told about the success of the Honor System and urged everyone to sign the articles. Dr. Needham then gave a very interesting and amusing talk on "Beast Tales." After the program all present stayed to an informal fudge party.

* * *

E. A. Stevens has been appointed coach of the intercollege crews. He will take charge of the crews as soon as they get on the water. Until then he is working with Coach Hadley.

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C. E. Ladd, '12, has been appointed assistant in the Department of Soils.

* * *

Mr. E. W. Thurston has just gone to West Hebron to teach Agriculture in the high school. He has what is said to be the largest class in high school agriculture in the state.

* * *

Mr. L. J. Cross of the Chemistry Department, attended the extension school at West Chazy, Clinton Co., during the week of March 13-18.

* * *

Prof. G. W. Cavanaugh spoke at a farmers' meeting at Canada, March 8, and at the Farmers' Institute School at Albion, Orleans Co., on March 11.

* * *

The Poultry Association met Wednesday, March 15th, and elected the following officers for next year: President, L. M. Hayes; vice-president, W. W. Coddington; secretary-treasurer, G. H. Masland; assistant secretary-treasurer, G. H. Pound; first director, R. F. Leaden; second director, H. A. Clarke.

* * *

The Department of Farm Management has arranged with several farmers to help keep their cost accounts in return for which the Department will have the average expenses from farms.

A. L. Thompson, '11, has been appointed an instructor in Farm Management.

* * *

A very valuable bulletin is soon to be issued by the Farm Mechanics Department. Its subject is Knots, Hitches, and Splices. It will contain about 125 pictures illustrating all the knots that are of any use to the farmer. It represents a year's work on this subject.

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The Farm Mechanics laboratory is becoming too small to accommodate the many students who are taking courses in the Department.

* * *

The Agricultural Musical Clubs held a very enjoyable smoker in Barnes Hall, Friday evening, March 17. Long stemmed clay stunt pipes, attractively decorated with green in honor of St. Patrick's day, were presented to the musicians. At the smoker, H. B. Rogers was re-elected president for the coming year and A. F. Barss was elected vice-president. Edward M. Tuttle and H. B. Rogers addressed the company, outlining the status of the clubs. The remainder of the program consisted of the following:

Musical Stunts, R. H. Hewitt, '13; Monologue, S. H. White, '12; Musical Stunt, G. T. Rich, '14 and G. B. Birkhahn, '11; Monologue, J. R. Van Kleek, '12; Pantomie Monologue, Buchanan Tyson, '12. Several members of the University Musical Clubs encouraged the men to try out for the University organizations.

* * *

Dr. Lyon of the Department of Soil Technology is in receipt of a letter from Dr. Squires of the New

Mexico Agricultural College saying that he intends to be in Ithaca at Commencement time. Dr. Squires graduated from Cornell in 1909.

* * *

In the February and March issues of the Journal of Franklin Institute, there appears an article on "The Relations of Certain Plants to the Nitrate Content of Soils" by Drs. Lyon and Bizzell.

* * *

Last Friday, March 10th, Dr. Lipman of the N. J. Experiment Station spoke before the Cornell Section of the American Society of Agronomy.

* * *

Prof. W. J. Spillman who is head of the Office of Farm Management at Washington, D. C., visited the College on Saturday, March 11th.

* * *

"The Report of the Commission on Country Life," has been published in book form by Sturgis & Walton Co., New York City.

* * *

"The Country Life Movement" is the title of a new book by L. H. Bailey. It will soon be off the press. Dean Bailey has also recently revised his book on "The Outlook to Nature," published by the Macmillan Co., New York City.

* * *

The dwarf orchard of the Department of Pomology will be moved to their main orchard grounds owing to the recent exchange of land between the College and the Athletic Management.

* * *

Mr. H. L. Ayres of the Dairy Department has been ill recently.

GENERAL AGRICULTURAL NEWS

Farmers' Week at the Alfred, N. Y., School of Agriculture—During the last two days of February and the first two days of March there was held at Alfred, N. Y., a 4-day farmers' institute. The State Department of Agriculture,

co-operating with the State School of Agriculture, gave an extended and unusually complete Country Life program. Technical lectures were given during the day and general and educational lectures in the evening.

To the men were delivered 28 lectures and demonstrations, and to the women eleven. Eight evening lectures were given in the overflowing opera house. Prominent speakers from afield addressed the meetings. The following connected with neither School nor State Department of Agriculture deserve special mention as indicative of the grade and range of the work: Dr. Boothe C. Davis, Mr. Charles M. Day, Prof. Arthur P. Dean, Dr. Arthur W. Gilbert, Prof. F. W. Howe, Prof. M. W. Harper, Prof. C. L. Mosher, Prof. James E. Rice, Mr. George E. Smith, Prof. H. H. Wing, and Mrs. Helen Binkerd Young.

The topics that received special attention were, the Soil, Dairy, Poultry, Horses, Sheep and Orchard. In many local institutes these topics had been treated in one or two lectures, whereas at this "round-up" institute these topics were given four, and some even eight and ten lectures. This practical and extensive treatment specially appeals to the farmers who can get away from their farms for the meetings. The interest was keen, the attention was steady, and increased through the four days. The registration is significant of the growing appreciation, in this section, of the Institute School. (The first school at Alfred was held in 1909). Registration, 656 in 1909, 917 in 1910, and 1130 in 1911. Even more striking than these figures for the whole institute is the growth of the women's section, 60 in 1909, 160 in 1910, and 254 in 1911.

* * *

Workers Ready for all who Need them—Although we hear every day of the country's unequaled prosperity, the Free Labor Bureau of the Bowery Mission, 227 Bowery New York, reports that there are now in the city more idle men than ever before, many able, honest men, qualified for any sort of farm work, laborers of every description, skilled workers, and others, all wanting work yet finding none to do.

The Mission's Labor Bureau exacts no fees whatever and welcomes com-

munications from anyone in need of capable men for any kind of work. Its share in relieving the condition of New York's unemployed has been very large and the Manager of the Bureau, Mr. J. T. Hunt, to whom letters should be addressed, is constantly hearing from employers, expressing gratitude for the men supplied and their proven worth.

* * *

Below is printed a copy of the resolutions concerning Canadian reciprocity presented to the Senate of the United States by the National Grange:

Approved:

NAHUM J. BACHELDER,
T. C. ATKESON,
AARON JONES,

Legislative Comm. Nat. Grange.

To The Hon. Senate of the U. S.,
Washington, D. C.

We, the undersigned farmers, respectfully urge that the Canadian Reciprocity bill now pending in Congress should not become law for the following reasons:

1. The bill provides for the admission free of duty of all Canadian farm products. Since Canada is the only country from which any considerable quantity of these products can under any circumstances be imported, this would result in practically free trade in everything the farmer produces.

2. While putting farm products on the free list the reciprocity bill makes no material reduction in the high tariff rates on all the manufactured articles the farmer buys, and therefore gives no relief from the heavy burden of taxation imposed by these duties.

3. The theory on which our protective policy has always been defended is that all classes and interests are equally entitled to protection. The farmers, however, receive much less protection than the manufacturers, for while farm products are taxed on the average about 25 per cent., manufactured articles are taxed on an average about 45 per cent.

4. The enactment of the Canadian reciprocity bill would still further dis-

criminate against the farmers, by abolishing the comparatively slight protection now given them, while leaving the high protective duties on manufactures practically untouched.

5. The Canadian farmers, by reason of their lower general tariff, and their preferential trade arrangements, can buy manufactured goods at lower prices than those prevailing in this country. The prices of farm lands in Canada are also much lower than in the United States. These conditions give the Canadian farmers an advantage over us, and the free admission of their products will subject us to unfair competition.

6. We hold that the farmers should receive exactly the same measure of protection as is given the manufacturers, and that there must be no reduction of duties on farm products, either by reciprocity or tariff revision, unless the duties on all manufactured articles are at the same time correspondingly reduced.

7. To show that this reciprocity measure is not an honest effort to reduce the cost of living in the interest of the consumer it is sufficient to point out that, while wheat is on the free list, flour is taxed 50 cents per barrel, and that while cattle, sheep, and hogs are free, meats, both fresh and cured, are taxed $1\frac{1}{2}$ cents per pound for the benefit of the Meat Trust.

As the adoption of the proposed reciprocity law would be a serious injury to the farming interests of this country, and would greatly reduce the value of our farm lands while increasing the value of Canadian farms, we earnestly protest against its enactment.

National Dairy Show Meeting—The annual meeting of the stockholders of the National Dairy Show Association was held in Chicago, Wednesday, March 1st. A report of the past year's work was made by the manager, Prof. H. E. VanNorman. After that, nine directors were elected and they are as follows: J. D. Nichols, Ohio;

H. E. Van Norman, Pennsylvania; Wm. Hill, Illinois; R. B. Swift, Illinois; A. J. Glover, Wisconsin; John Irwin, Minnesota; Charles Hill, Wisconsin and F. J. McNish, Illinois. The holdover members of the board of directors are: E. K. Slater, J. A. Walker and W. B. Barney. The purpose and object of increasing the board of directors was to give opportunity to have all branches of the dairy industry represented on the board and to enlist the services of more people.

At the meeting of the board of directors, which followed the stockholders' meeting, H. E. Van Norman was elected president, John D. Nichols, vice-president; Wm. Hill, secretary; and J. A. Walker, treasurer. A committee of three consisting of J. A. Walker, F. J. McNish and Wm. Hill was elected to perfect the organization. A meeting of the board of directors will be held April 7th for the purpose of receiving bids from different cities for the annual meeting of the National Dairy Show Association, arranging dates of show and selecting a manager.

* * *

Fruit growers and all who are striving to protect their fruit and vegetables against their enemies need a copy of the new and handsomely illustrated catalog just issued by the Goulds Mfg. Co., of Seneca Falls, N. Y. It contains full directions how to spray various fruits and berries, what spray to use for the numerous diseases of each, and how to mix the right spray solutions to effectively combat these diseases.

This new catalog shows the "Monarch" and "Emperor" types of Goulds sprayers fitted with horizontal instead of the usual vertical air-chamber. This reduces the height of the pumps materially, makes them more compact, easier to pass under trees, and altogether much more convenient to handle.

Another new feature that will be greatly appreciated is the devoting of two pages to the illustration and description of Spray Pump Parts.

FORMER STUDENTS



F. H. RICHARDS, Sp., '03.

Sp. '99-'03—Francis H. Richards of North Bennington, Vermont, was born at Enfield, Massachusetts, and was brought up as a farm boy attending the schools of that town. He entered Cornell in September, 1899. After two years of college work he went abroad as a salesman where he remained a year returning in the fall of 1902 to finish his course making a specialty of animal husbandry and dairying. After leaving Cornell in 1903, he began work as a salesman for a dairy supply company.

The following spring he resigned and took a position as superintendent of a large dairy farm near New York City with one hundred cows where certified milk was produced that sold in New York City for 15 cts. per quart. After staying on this farm for a year the position as superintendent of the state farm at the Danvers Insane Hospital was offered him which he accepted. This farm contained several hundred acres most of it being in grass and under cultivation. Over

one hundred men were employed. The stock consisted of about 200 head of cattle, 500 hogs and 3000 poultry. There were 17 acres in gardens which supplied vegetables for the hospital containing 1600 people. A continual supply of soil crops including alfalfa was fed to 130 dairy cows during the summer months and 800 tons of silage and 425 tons of hay were harvested the last year Mr. Richards was superintendent. Besides these extensive farm operations several acres of land were cleared each year. A large amount of stone road was built. One cattle and hay barn was built and one large barn was remodelled inside. Mr. Richards installed the first and largest Burrell-Lawrence-Kennedy milking machine outfit in New England. Was the first to use an electric motor with hoist to lift large loads of hay into the mows, lifting a whole load at once. Some days as many as 30 or 40 tons being unloaded in a few hours. While at the state farm, Mr. Richards had charge of some of the earliest experiments in the United States with Von Behring's bovo-vaccine test which is designed to protect animals from tubercular infection.

In the spring of 1907, Mr. Richards resigned his position at the state farm as his father had died the fall before leaving the home farm to be cared for. That year he settled up his father's estate and sold the farm in the spring of 1908. After selling out he accepted a position as superintendent of the Carver Hill Farms at Natick, Massachusetts, owned by Mr. W. S. Patten of Boston. Here the process of building and improving began. Barns were moved and new buildings put up until a fine set of up-to-date farm and dairy barns with modern boarding house for help took the place of the old ones. Here many practical and original ideas were worked out in barn construction. All of these buildings were designed and the work personally superintended by Mr. Richards.

In June, 1909, Mr. Richards resigned and accepted a position at the Fair-

view Farms at North Bennington, Vermont, the summer home of Mr. F. B. Jennings of New York. This estate is one of the finest in New England and is beautifully located. Since coming here Mr. Richards has made many changes and improvements; among them is a large brooder plant and incubator house, the beginning of a fine poultry plant. Mr. Richards is aiming to make each department of this farm a paying business by itself.

'95, B. S. A.—George Harold Powell has resigned as acting chief of the Bureau of Plant Industry, United States Department of Agriculture, and has taken the position of secretary and manager of the Citrus Protective League of California, with offices in Los Angeles.

'01, W. A.—Harry Winters has been appointed farm inspector in the N. Y. State Department of Agriculture. His duties consist in part in the inspection of farms connected with state institutions.

'05, W. P.—Gustave Walters is in charge of the poultry division of the Johnson Stock Farm at Marion, N. D., where he has erected two poultry houses each over 600 feet long. Mr. Walters plans to raise 30,000 chickens this year.

'06, B. S. A.—John A. Barron has been appointed Agriculturist for the Delaware Lackawanna & Western R. R. His headquarters are in the Chamber of Commerce Bldg., Binghamton, N. Y.

'07, B. S. A.—Gordon D. Cooper has returned to his home in Boston from the South. He superintended the planting of seven carloads of trees and shrubs at Corey, Ala., the new industrial town in the Birmingham district, where the United States Steel Corporation is putting nine million dollars into new steel plants.

'07, B. S. A.—H. F. Prince has returned to his fruit ranch, R. F. D. 2, Grand Junction, Col.

'08, B. S. A.—R. A. Wooglan is now travelling through India, Africa, and other tropical countries, on a special commission for the United States Bureau of Entomology, attempting to discover parasites of the white fly, which is so injurious to citrous crops. He was last reported from Java.

'08, Sp.—W. O. Tiffany recently sent into the Poultry Department an interesting curiosity. It consisted of a large hen's egg, eight inches in circumference, inside of which was another perfectly formed medium-sized egg. Inside this second egg was a still smaller third egg. All three eggs had well developed shells.

'08 Sp.—Walter G. DePew is engaged in dairy farming at his home near Canandaigua, and is producing sanitary milk at a very low cost. Mr. DePew has a fine herd of Guernseys, some of which are imported.

'09, B. S. A.—The Yesterlaid Egg Farm Co., has recently published a very complete and original booklet describing in detail the egg industry of this company. It is remarkable how well regulated and systematic the business is conducted. Due to this, the company is meeting with well earned success. R. C. Lawry is manager of the company.

'10, B. S. A.—J. H. Rutherford is now managing a 360 acre farm, owned by Ernest O. Koser, Somerset, Pa. Being near Ithaca early in March, he visited the College for a few days. His address is R. F. D. 6, Somerset, Pa.

'10, B. S. A.—Mr. B. D. Lamphear was married on March 1st, to Miss Mabelle Wallace Kresge at Newfield, N. Y. Mr. and Mrs. Lamphear will live in Rome, N. Y., after May 1st.

'10 B. S. A.—George Becker is now assistant entomologist at the University of Arkansas.

'11, W. P.—Mr. Wright, who was president of the Winter Course Poultry Club, has purchased a fine fruit and poultry farm near Rochester, N. Y.



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SPRAYING NOZZLE IN OPERATION IN OKANAGAN FRUIT GROWING SECTION OF BRITISH COLUMBIA.
(See page 305)